MOD 15 (LAI/FPAR)
Collection 4 Algorithm Readiness

Ranga Myneni, Yuri Knyazikhin, Nikolay Shabanov, Petr Votava

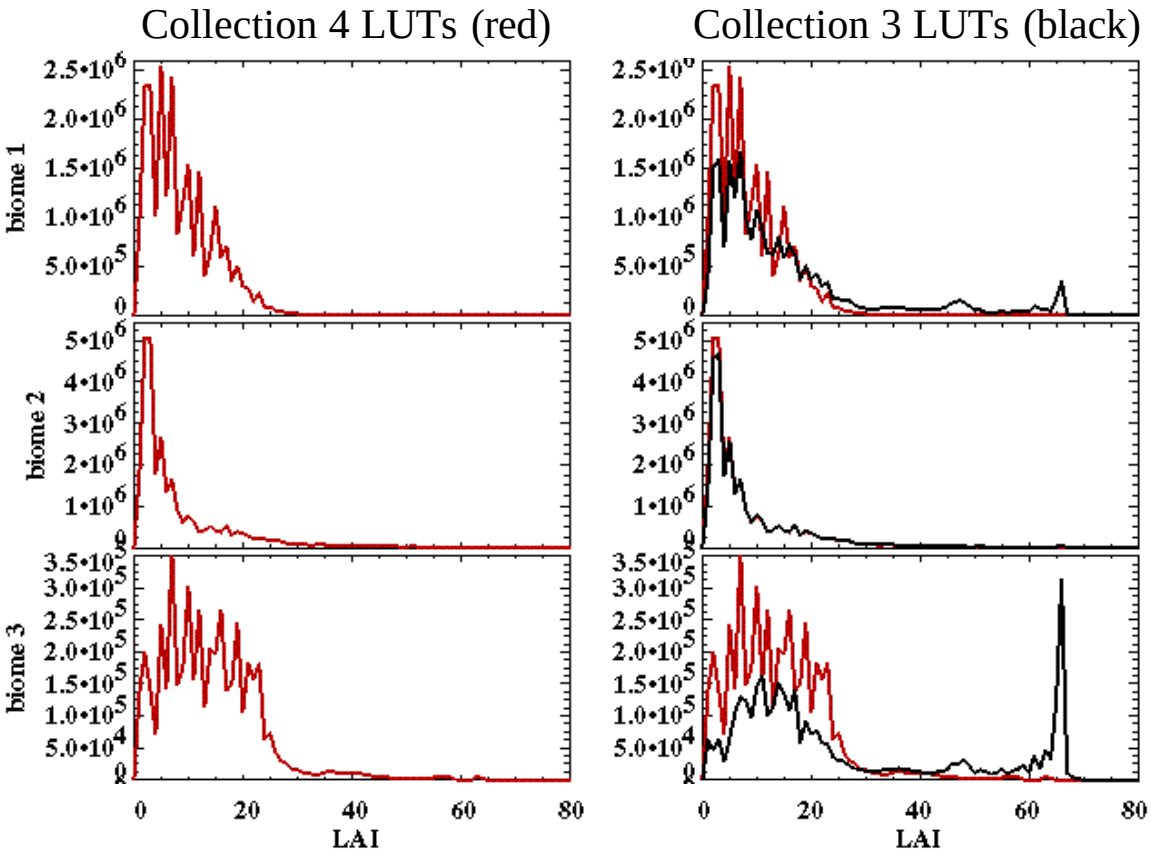
Changes in Collection 4

- Improved LUTs for the main and back-up algorithms for biomes 1 and 3 (PGE33/MOD15A1)
  - Benefits:
  a) High quality retrievals have been increased by 10%
  b) Non-physical peaks in the global LAI distribution have been removed
  c) Improved agreement with field measurements (BigFoot data over ARGO and KONZ sites)
- Improved QA scheme
  - Benefits:
  a) Consistency between MODLAND and SCF_QC quality flags has been achieved
  b) Interpretation of QA has been substantially simplified
- At-launch static IGBP land cover, used as input to the LAI/FPAR algorithm, was replaced with the MODIS land cover map (MOD12Q1, layer 3)
  - Benefits:
  a) Crosswalking of 17 classes IGBP scheme to 6-biome LC has been eliminated
  b) Uncertainties in the MODIS LAI/FPAR product due to uncertainties in land cover map have been substantially reduced

Changes in Collection 4 (Contd.)

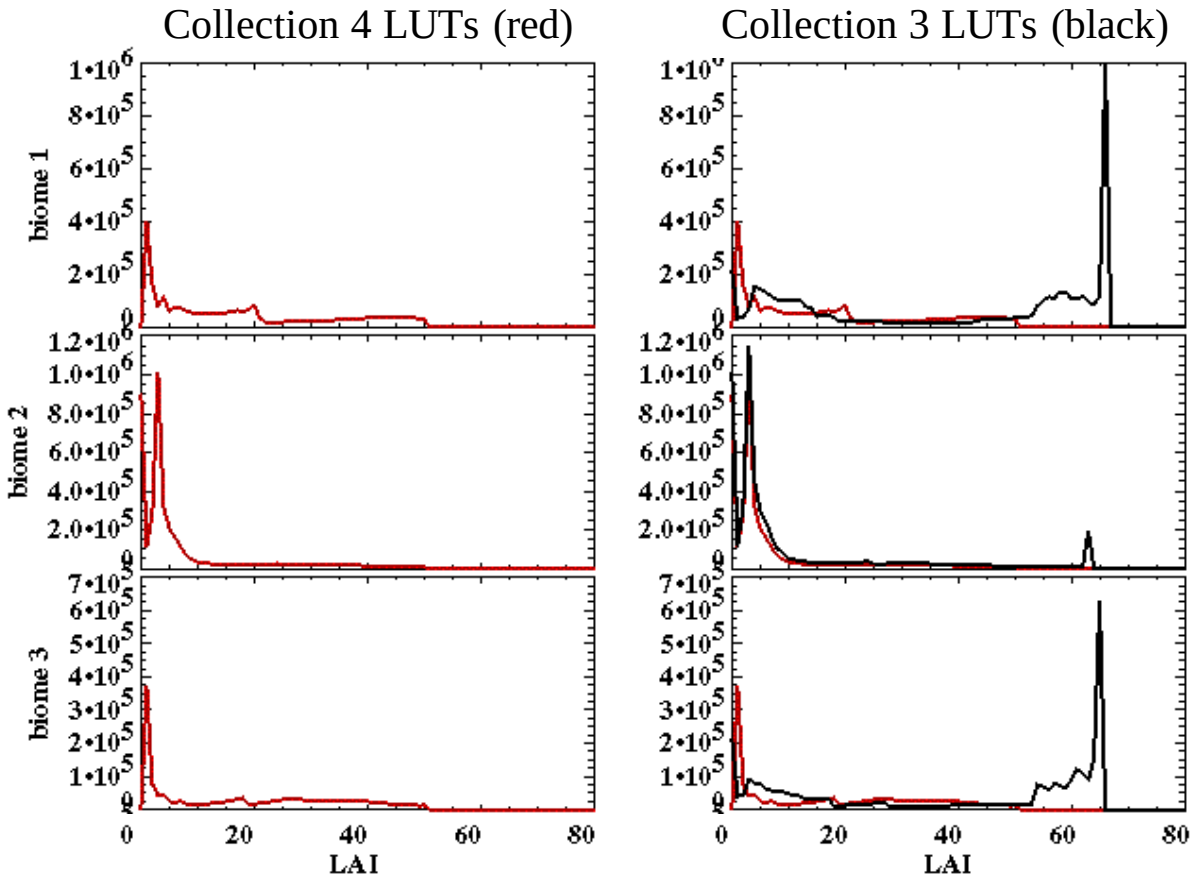
- Projection change from ISIN to SIN
  - Benefits: Complies with Land team reprojection strategy
- Fixed problem in daily product where 0's instead of Fill values were showing in between scans (pointed to by LDOPE)
  - Benefits: Correctness of MOD15A1
- New 8-day compositing scheme (PGE34/MOD15A2)
  - Benefits:
    a) Compositing over best quality retrievals, instead of all retrievals
    b) Lowers LAI values, decreases saturation and number of pixels generated by the back-up algorithm

Changes in Global Histograms of LAI for Main Algorithm for biomes 1-3



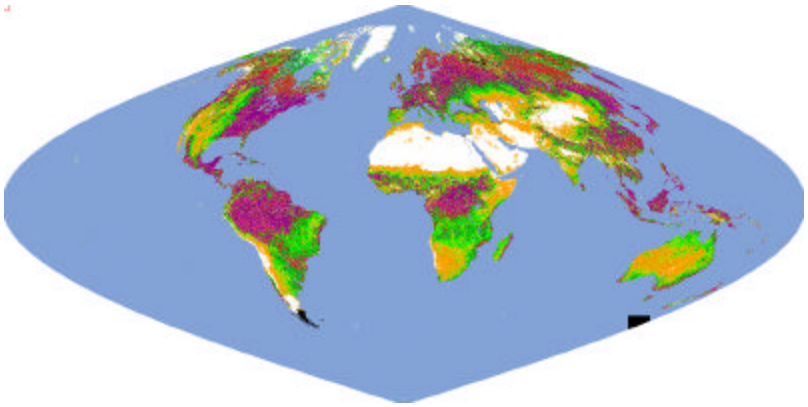
By tuning LUTs for main algorithm we decreased in collection 4 amount of pixels generated by main algorithm under condition of saturation for biome 1 and 3 (peaks with high LAI are eliminated).

Changes in Global Histograms of LAI for Back-Up Algorithm for biomes 1-3



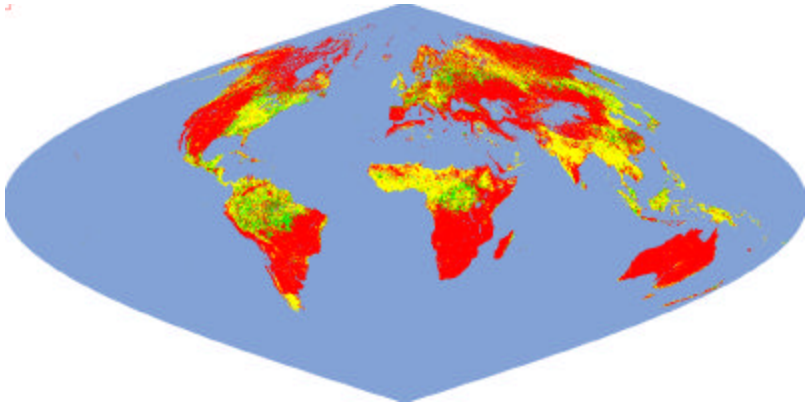
Back-up algorithm LUTs were also adjusted to match main algorithm LUTs. This resulted in eliminating peaks with high LAI, similarly to main algorithm case. This improves fit to field measurements.

Collection 3 LUTs



LAI

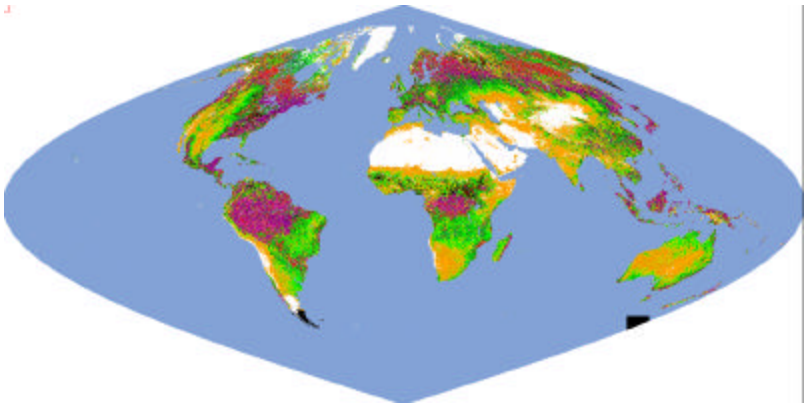
- No Data
- 0.0
- 0.1 – 0.2
- 0.3 – 0.4
- 0.5 – 0.7
- 0.8 – 1.1
- 1.2 – 1.5
- 1.6 – 2.0
- 2.1 – 2.7
- 2.8 – 3.3
- 3.4 – 4.3
- 4.4 – 5.3
- 5.4 – 6.0
- 6.1 – 7.0



SCF_QC

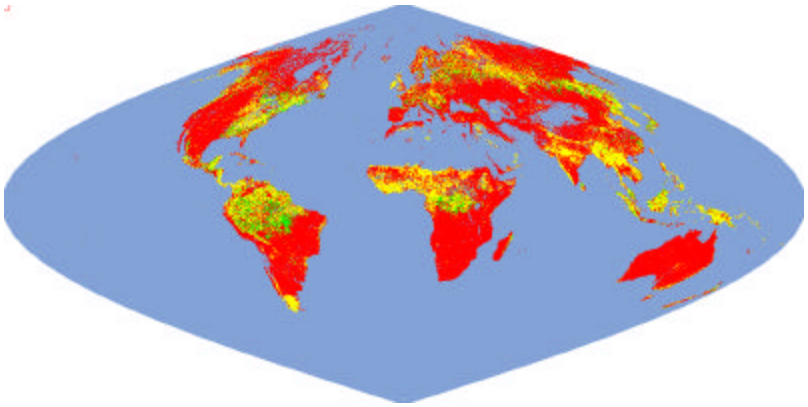
- Main no saturation (63%)
- Main with saturation (8%)
- Back-up (29%)

Collection 4 LUTs



LAI

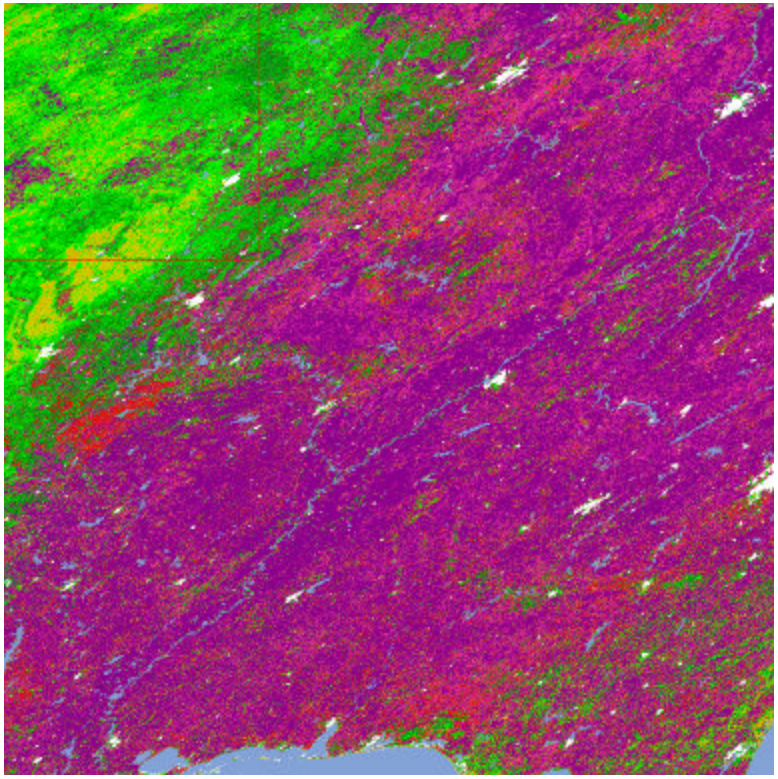
- No Data
- 0.0
- 0.1 – 0.2
- 0.3 – 0.4
- 0.5 – 0.7
- 0.8 – 1.1
- 1.2 – 1.5
- 1.6 – 2.0
- 2.1 – 2.7
- 2.8 – 3.3
- 3.4 – 4.3
- 4.4 – 5.3
- 5.4 – 6.0
- 6.1 – 7.0



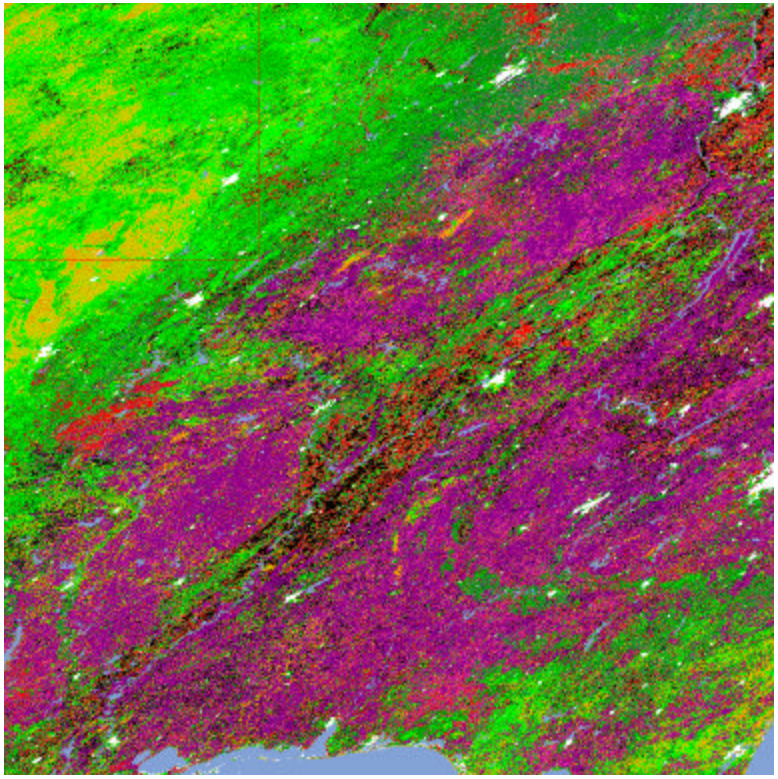
SCF_QC

- Main no saturation (71%)
- Main with saturation (6%)
- Back-up (23%)

Tile h10v05 (includes BigFoot KONZ site)

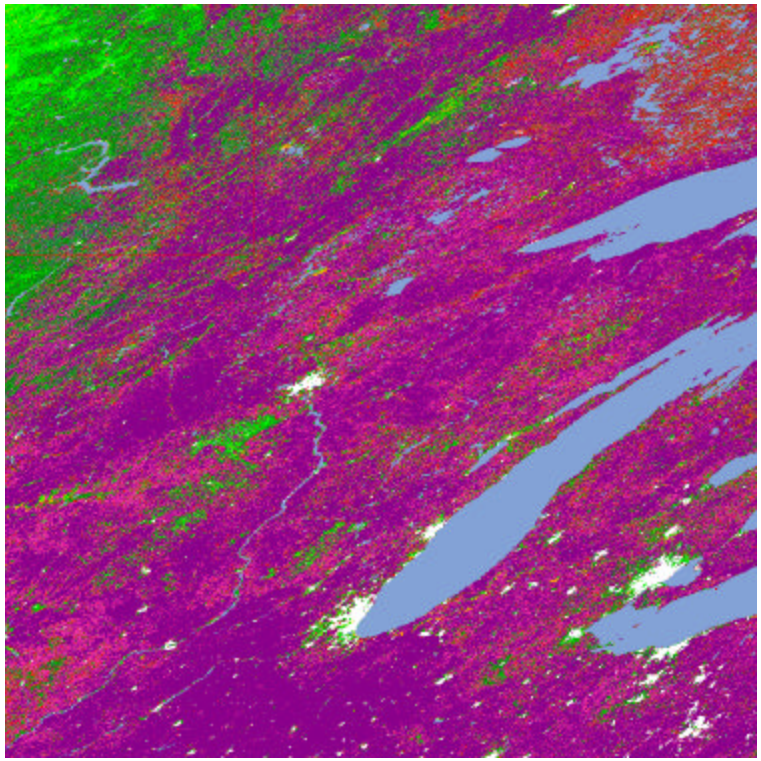


LAI: Collection 3 LUTs

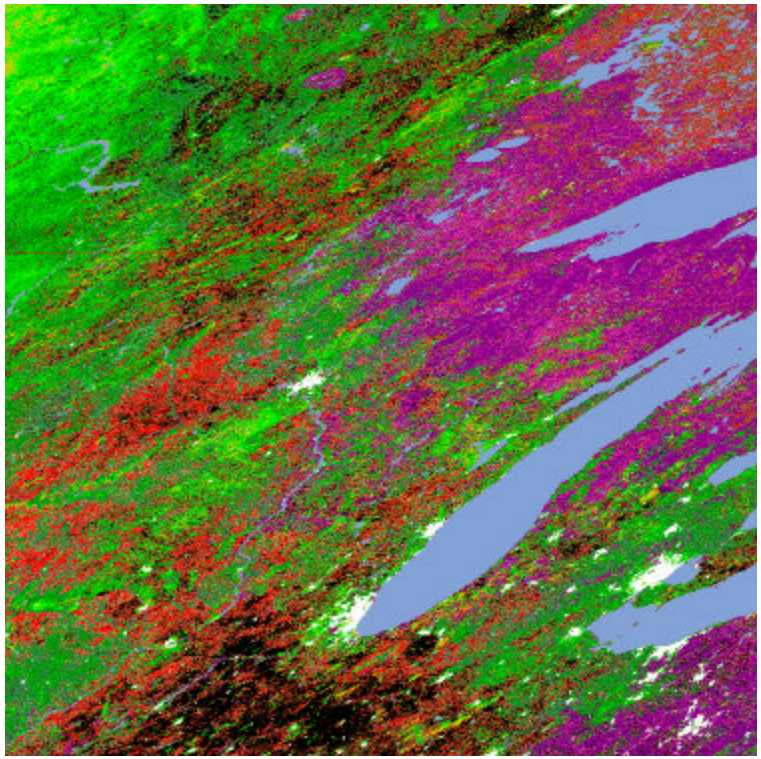


LAI: Collection 4 LUTs

Tile h11v04 (includes BigFoot ARGO site)



LAI: Collection 3 LUTs



LAI: Collection 4 LUTs

Remaining Issues

- New compositing scheme and updated LUTs result in lower LAI values and increased retrieval quality of LAIs over biomes 1-3. Further analysis of MODAGG data to improve retrievals over biomes 4-6 is needed.

- What are the scientific issues at this point?
  - Improve consistency with field data (more field sampling is needed)
  - Work on seasonality problems for needle leaf forests.

Expected Changes

- Will adjust LUTs to decrease saturation and back-up retrievals for biomes 4-6 to improve agreement with field data
- Combined Terra/Aqua product (late Collection 4 or Collection 5)